D8 ULTRA-EFFICIENT COMMERCIAL AIRCRAFT

FROM THE JET AGE TO THE EFFICIENCY AGE

Aurora
FLIGHT SCIENCES

IN THE YEAR 1958...

...the Boeing 707 ushered in the jet age. The aircraft's radical design allowed passenger planes to fly higher, faster and farther, making much of the world accessible within a single day's travel for the first time. The key to the 707's success was to challenge the accepted orthodoxy of aircraft design and piston engines by reconfiguring every aspect of the air vehicle to maximize speed, efficiency and payload capacity. 50 years later the 707's tube-wing design is still the global standard for all commercial aircraft. Over that time we have made enormous technological advances in propulsion systems, avionics and structures, creating improvements in fuel efficiency, community noise and passenger costs. In comparison, the standard tube-wing design is only forecasted to continue improving at a rate of 1.5% per year. This limited rate of improvement comes despite billions of dollars spent in annual research and development and the efforts of thousands of highly qualified engineers. At Aurora Flight Sciences we believe the time has come, once again, to challenge the status quo and change the paradigm of aircraft design. Utilizing existing technologies and advanced composite materials, we have re-thought and re-configured every aspect of the air vehicle to maximize efficiency, minimize operating costs, and improve the passenger experience.

FROM DESIGN TO FLIGHT DEMONSTRATOR

THE AEROSPACE INNOVATOR'S DILEMMA

Competing aerospace incumbents are unwilling and unable to adopt a radical new aircraft configuration given their significant investments in existing products, often driven by customer expectations and constraints. This business phenomenon, often described as "the innovator's dilemma," constrains industry incumbents from taking the risks necessary to radically restructure their product lines in order to remain competitive. Due to these self-imposed constraints, industry incumbents are unable to innovate from within; rather, innovation is often achieved when smaller entrepreneurial companies change the paradigm by developing new and sometimes radical products enabled by new and high-risk technologies.

CHANGING THE PARADIGM

Like the Boeing 367-80 flight demonstrator, the D8 is a sufficiently radical departure from the existing paradigm. As such, it will require a flight demonstrator to validate its aerodynamic design and to prove its revolutionary energy efficiency and reduced environmental impact. A 1:2 scale D8 X-Plane will achieve significant technological objectives, including demonstrating boundary layer ingestion enabled by a unique propulsion-airframe integration and demonstrating a revolutionary fuselage enabled by advances in the design and fabrication of composite structures.

COLLABORATIVE INNOVATION

NASA has often been at the forefront in driving change within the structure of the aerospace industry. A recent example is NASA's sponsorship of SpaceX to radically change the paradigm within the launch vehicle industry. NASA now has the opportunity to achieve similar results in commercial aviation.

Aurora's approach is to assemble a team with the flexibility and expertise to put a revolutionary flight demonstrator in the air quickly. By partnering with NASA, MIT, Pratt & Whitney, and the FAA, the Aurora team will span 11 facilities across the US and employ some of the world's best engineers and scientists, all with one goal: building a 1:2 scale D8 X-Plane in the next three years.

AURORA

HQ: MANASSAS, VA
Engineering and assembly

R&D: CAMBRIDGE, MA
Design and lead scientists

COLUMBUS, MS
Automated, advanced composite manufacturing for large aerostructures

BRIDGEPORT, WV
Composite manufacturing and assembly

NASA

LANGLEY, VA
Design & analysis support, CFD and wind tunnels

ARMSTRONG, CA
Flight test and air vehicle design support

AMES, CA
Design & analysis support, CFD and wind tunnels

GLENN, OH
Propulsion support and engine ground tests

MIT

CAMBRIDGE, MA
Premier research institution, technical oversight and student education

PRATT AND WHITNEY

HARTFORD, CT
Engine research, fabrication, modification and testing

Aurora FLIGHT SCIENCES

FROM THE JET AGE TO THE EFFICIENCY AGE

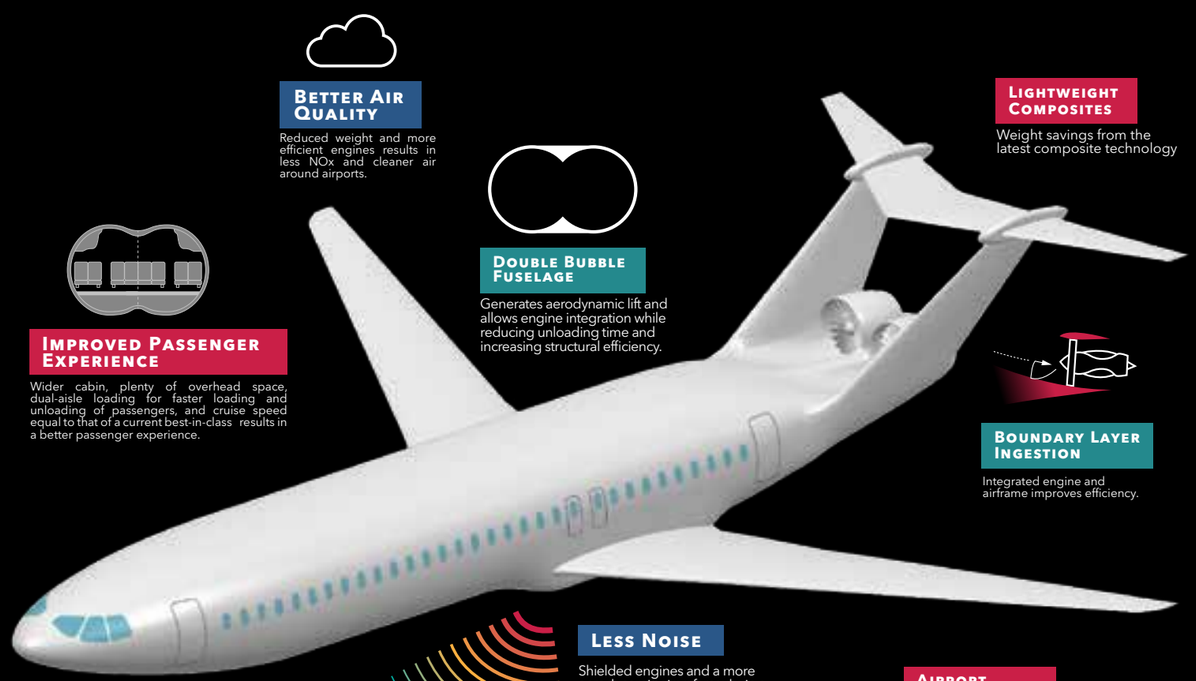
The D8 aircraft will usher in a new era of efficiency and affordability in commercial air travel

By 2027 entry into service, the D8 will be

50% more efficient

than current best-in-class aircraft.

If adopted worldwide, it would yield a **25% GLOBAL REDUCTION** in total fuel consumption.



Better Air Quality

Reduced weight and more efficient engines results in less NOx and cleaner air around airports.

Improved Passenger Experience

Wider cabin, plenty of overhead space, dual-aisle loading for faster loading and unloading of passengers, and cruise speed equal to that of a current best-in-class results in a better passenger experience.

Double Bubble Fuselage

Generates aerodynamic lift and allows engine integration while reducing unloading time and increasing structural efficiency.

Lightweight Composites

Weight savings from the latest composite technology

Boundary Layer Ingestion

Integrated engine and airframe improves efficiency.

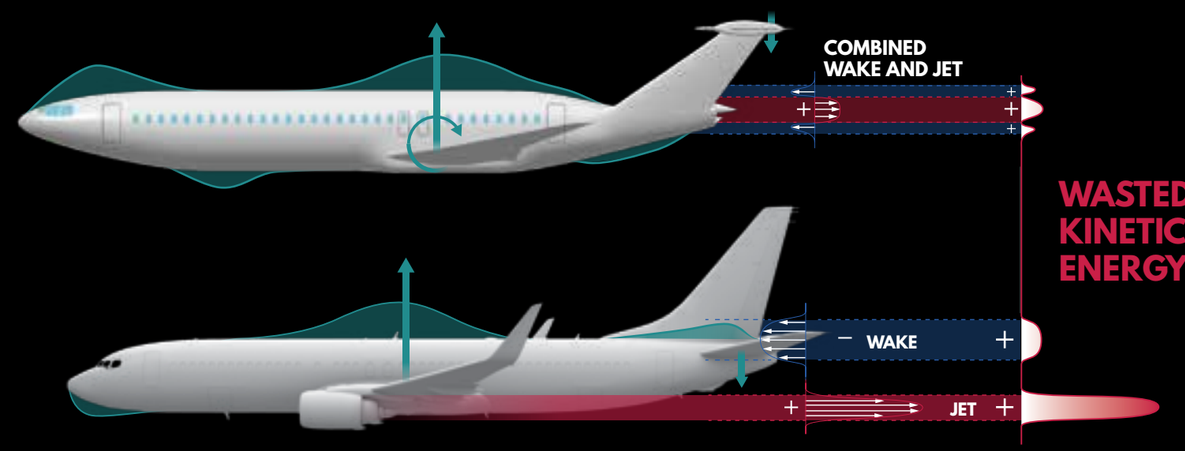
Less Noise

Shielded engines and a more aerodynamic aircraft results in a smaller community noise footprint (40EPNdB reduction).

50x reduction in community noise.

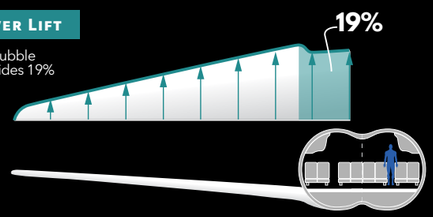
Airport Compatibility

Designed to fit into existing gates and operate from even shorter runways to maximize airport compatibility.

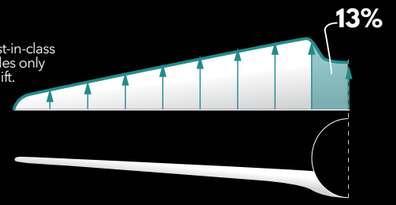


Carryover Lift

The Double Bubble fuselage provides 19% carryover lift.



The current best-in-class fuselage provides only 13% carryover lift.



A TALE OF TWO FLIGHTS

LAX TO JFK

AURORA D8 vs. CURRENT AIRCRAFT

FASTER LOADING

The twin-aisle double bubble fuselage is revolutionary for markets typically served by single-aisle airplanes like the current best-in-class. Faster loading and unloading means quicker, more efficient turn-around times for airlines and a better travel experience for passengers.

Los Angeles, CA

TAKEOFF

The D8 has a reduced takeoff length and can operate from more airports than the current best-in-class. During takeoff, the D8's shielded engines and efficient design mean less noise impacts on nearby communities.

MACH 0.8 SPEED

While slowing down has the potential to save even more fuel, the D8 is designed to fly the same transonic speeds as the current best-in-class. When combined with shorter times at the gate, passengers can have more time efficient door-to-door trips.

ARRIVAL

Low noise means more direct approaches can be flown with less impact on surrounding communities. Quicker unloading means passengers can exit the plane faster than on a current best-in-class aircraft and the airline can turn the airplane around for even greater utilization.

New York, NY
2,475 MILES

Learn More
www.aurora.aero

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